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6 separate items are enclosed

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MEMORANDUM FOR PR (Contractor/In-House Publication)

FROM: PROI (TI) (STINFO) 26 Jun 2000

SUBJECT: Authorization for Release of Technical Information, Control Number: **AFRL-PR-ED-AB-2000-142**
P. Wapner (ERC); W. Hoffman, "Microsensors that Function on the Basis of Surface and Wettability" (Abstract)

Fall Meeting of Materials Research Society **(Statement A)**
(Boston, MA, 03 Dec 2000) **(Submission Deadline: 10 Jul 2000)**

1. This request has been reviewed by the Foreign Disclosure Office for: a.) appropriateness of distribution statement, b.) military/national critical technology, c.) export controls or distribution restrictions, d.) appropriateness for release to a foreign nation, and e.) technical sensitivity and/or economic sensitivity.
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_____

PHILIP A. KESSEL Date
Technical Advisor
Propulsion Science and Advanced Concepts Division

20021119 091

MICROSENSORS THAT FUNCTION ON THE BASIS OF SURFACE TENSION AND WETTABILITY

The displacement of non-wetting fluid droplets contained within capillaries that have axial profiles that are non-uniform can be used to accurately and reproducibility measure the forces acting upon these droplets. The position of droplets within such micro-sensors is dictated by surface tension, wettability, geometric configuration of the confining walls, and the forces acting upon the droplet. These micro-sensors can measure pressure and acceleration, and can also be made to operate as micro-valves, micro-switches, optical shutters, as well as other devices. They have no moving mechanical parts to wear out, and can theoretically endure high amounts of over-actuation and still return to initial levels of accuracy and precision without harm. The axial profiles of these shaped capillaries are easily fabricated using microtube technology developed at the Air Force Research Laboratory at Edwards Air Force Base. However, it is also possible to use non-circular shaped voids and still achieve similar capabilities with some limitations. These non-circular shaped voids can be manufactured using more conventional MEMS technologies such as photolithography and LIGA.

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